

3.3.6 SHIPMENT OF MIXED TRANSURANIC WASTE (SBW/NEWLY GENERATED LIQUID WASTE) TO THE HANFORD SITE FOR TREATMENT

In this option, the existing liquid mixed transuranic waste/SBW would be pumped from the INTEC Tank Farm to new permitted tank storage. Mixed transuranic waste (newly generated liquid wastes), after being concentrated, would be stored in the new storage tanks with the existing liquid mixed transuranic waste/SBW. The liquid waste would remain in the new storage tanks until being sent to a new packaging facility where it would be solidified by absorption on a 90 percent silica matrix and placed into shipping containers. There would be a short period of onsite storage, until enough containers accumulate to ship to the Hanford Site for treatment. DOE has evaluated several methods for processing the mixed transuranic waste (SBW/newly generated liquid waste) at Hanford: direct vitrification, chemical dissolution followed by separations, and mechanical separation of solid and liquid material. DOE has eliminated all of these methods from further analysis in this EIS for the reasons listed below.

Direct vitrification of the mixed transuranic waste (SBW/newly generated liquid waste) at Hanford poses several technical uncertainties that would need to be overcome before it could be implemented. First, the mixed transuranic waste is acidic under the absorbed scenario, while the Hanford facilities are presently being designed and permitted for alkaline materials. Thus, this waste stream would be the only acid waste stream proposed for processing in the Hanford facilities. The Hanford facilities would require modifications to process an acid stream. Second, modifications to the offgas systems at the Hanford HLW vitrification facility would be required to address higher concentrations of contaminants such as mercury and higher level of nitrogen oxides associated with the mixed transuranic waste (SBW/newly generated liquid waste). Finally, direct vitrification of the mixed transuranic waste would result in the generation

of approximately 1,500 Hanford HLW canisters, which would have an estimated disposal cost of \$650 million [based on DOE (1996b)]. DOE has included for evaluation in this EIS several other methods for treatment of the mixed transuranic waste that do not result in this large disposal cost (e.g., treatment by cesium ion-exchange and grouting under the Minimum INEEL Processing Alternative).

DOE does not consider chemical dissolution of the solidified mixed transuranic waste (SBW/newly generated liquid waste) followed by separations to be a viable option because the only known dissolution agent for the absorbent material is highly concentrated hydrofluoric acid (Jacobs 1998). DOE's past experience with hydrofluoric acid dissolution processes has demonstrated it to be complex and to present health and safety risks (Jacobs 1998).

DOE does not consider mechanical separation of solid and liquid material to be a viable option. While the majority of liquid could be removed through a vacuum-extraction process, DOE's past experience in removing materials from natural or geologic matrices (e.g., soil washing studies, soil partitioning studies) indicates it would be difficult to remove enough of the transuranic material (bound with covalent bonds or trapped in pore spaces) to dispose of the absorbent as low-level waste.

For these reasons, the option of shipment of mixed transuranic waste (SBW/newly generated liquid waste) to the Hanford Site for treatment was eliminated from further consideration in this EIS.

3.3.7 TREATMENT OF MIXED TRANSURANIC WASTE/SBW AT THE ADVANCED MIXED WASTE TREATMENT PROJECT

In this option the mixed transuranic waste/SBW would be shipped to the proposed INEEL Advanced Mixed Waste Treatment Project for treatment, with the resulting waste form then being shipped to the Waste Isolation Pilot Plant

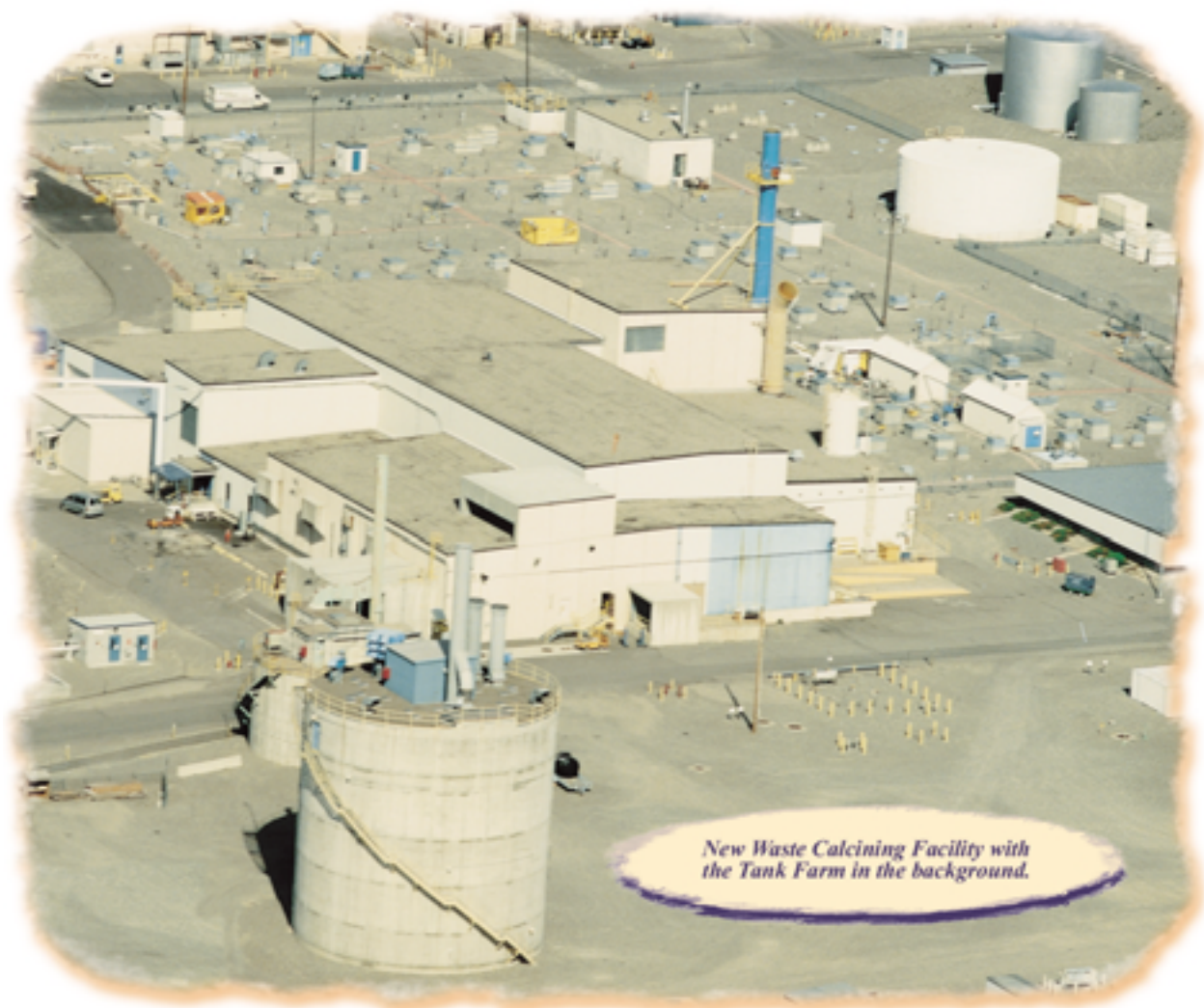
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for disposal. As currently envisioned, the Advanced Mixed Waste Treatment Project could treat up to 120,000 cubic meters of alpha-contaminated and transuranic wastes from INEEL or other DOE sites. The Advanced Mixed Waste Treatment Project would employ multiple treatment technologies (including supercompaction, macroencapsulation, and microencapsulation) to produce final waste forms that would be certified for disposal at the Waste Isolation Pilot Plant.

The Advanced Mixed Waste Treatment Project treatment units can accommodate contact handled wastes only. As currently designed, all wastes destined for thermal treatment at the Advanced Mixed Waste Treatment Project would be required to be in a dry solid form, as the facility is not configured to process liquid wastes. The mixed transuranic waste/SBW is a

liquid highly radioactive transuranic waste. Thus, the mixed transuranic waste/SBW would require pre-treatment (i.e., cesium ion exchange) before shipment to the Advanced Mixed Waste Treatment Project.

Several modifications to the Advanced Mixed Waste Treatment Project to process liquids would be required. These modifications include liquid waste storage and feed systems and additional control systems. Modifications to accept liquid mixed transuranic waste/SBW could disrupt the ongoing Advanced Mixed Waste Treatment Project design and permitting activities, jeopardizing compliance with the Settlement Agreement/Consent Order and increasing costs for the Advanced Mixed Waste Treatment Project. In addition, because of the highly acidic nature of the mixed transuranic



*New Waste Calcining Facility with
the Tank Farm in the background.*

waste/SBW, modifications to the Advanced Mixed Waste Treatment Project offgas system to remove the additional nitrogen oxides would be necessary.

This EIS contains an alternative (Minimum INEEL Processing) that processes the mixed transuranic waste/SBW into a waste form that is suitable for disposal at the Waste Isolation Pilot Plant. Using this non-thermal technology would allow the mixed transuranic waste/SBW to be placed into a final form acceptable for disposal using fewer pretreatment or treatment steps and generating less secondary waste than treatment at the Advanced Mixed Waste Treatment Project. Therefore, use of the Advanced Mixed Waste Treatment Project does not fulfill a regulatory or operational need that is not otherwise met by other options to be evaluated in this EIS.

For these reasons, the option of treatment of mixed transuranic waste/SBW at the Advanced Mixed Waste Treatment Project was eliminated from further consideration in this EIS.

3.4 Summary Level Comparison of Impacts

This section compares the potential environmental impacts of implementing each of the alternatives described in Sections 3.1 and 3.2. This brief comparison of impacts is presented to aid the decisionmakers and public in understanding the potential environmental consequences of proceeding with each of the alternatives under consideration.

The following discussion is based on the detailed information presented in Chapter 5, Environmental Consequences. The environmental impact analyses are designed to produce a reasonable projection of the upper bound for potential environmental consequences. This requires the use of appropriately conservative assumptions and analytical approaches. Further discussion of the level of conservatism and degree of uncertainty in these analyses is presented in Chapter 5. Table 3-5 summarizes some of the key attributes of the alternatives and options (see

Appendix C.10 for more details). Figure 3-16 shows the general timeframe for the EIS (e.g., the period of analysis and key dates) and the milestones for the alternatives and options. Table 3-6 summarizes the potential impacts of each alternative for the various environmental disciplines.

Key differences between the impacts for the alternatives and options include:

- The waste products for each waste processing alternative are summarized in Table 3-5. The type and quantity of product waste varies with the combination of pretreatment (calcination, radionuclide separations) and immobilization (vitrification, cement, ceramic) technologies that are used. The Separations Alternative and Minimum INEEL Processing Alternative (which includes separations at the Hanford Site) would produce the least HLW canisters. The Non-Separations Alternative would significantly increase the number of HLW canisters that are produced.
- Transportation related impacts would be greatest for Non-Separations Alternative due to the high number of HLW shipments to a repository. Transportation impacts would also be higher for the Transuranic Separations Option due to the greater distances associated with transport of the low-level waste Class C type grout to an offsite disposal facility (assumed to be located in Barnwell, South Carolina).
- The Separations Alternative and Minimum INEEL Processing Alternative could include construction of a Low-Activity Waste Disposal Facility near INTEC. Those alternatives would result in slightly greater land use and ecological impacts due to the construction of this facility on undeveloped land.
- Radiological air emissions would be highest for the Continued Current Operations Alternative, Planning Basis Option, Hot Isostatic Pressed Waste Option, and Direct Cement Waste

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Option as a result of operation of the New Waste Calcining Facility beyond June 2000 and management of mixed transuranic waste (newly generated liquid waste and Tank Farm heel waste).

- Nonradiological air emissions would be highest for the Full Separations, Planning Basis, and Hot Isostatic Pressed Waste Options. These emissions are a result of fossil fuel consumption to meet the energy requirements (steam) of the waste processing facilities.
- The Separations Alternative would require greater construction activity. This would result in higher construction employment with corresponding health and safety impacts (lost workdays).
- Fossil fuel consumption would be highest for the Separations Alternative (Full Separations and Planning Basis Options) and options that use energy-intensive treatment technologies (Hot Isostatic Pressed Waste and Direct Cement Waste Options).
- Accident impacts (abnormal and design basis events) would be highest for the No Action and Continued Current Operations Alternatives. The bounding accident for those alternatives involves long-term storage of calcine in the bin sets. Beyond design basis event impacts would be greatest for an accident involving the vitrification processes under the

Full Separations and Planning Basis Options.

The compliance status of the alternatives is addressed in Section 6.3 of the EIS.

DOE is developing a cost evaluation that it expects to complete and make available to the public before the Record of Decision for this EIS. For each alternative and option, the cost evaluation will consider capital costs for new facilities or upgrades to existing facilities, operation and maintenance costs for existing and new facilities, decontamination and decommissioning costs for new facilities and any transportation and disposal costs. This evaluation will address the total system life-cycle costs for each alternative and option. DOE will consider the results of the cost evaluation in its decisions based on this EIS.

3.5 Preferred Alternative

As of the publication of this Draft Environmental Impact Statement, DOE has not selected a preferred alternative. As a cooperating agency, the State of Idaho has not yet selected a preferred alternative.

A preferred alternative(s) will be named in the final Environmental Impact Statement after public comments on the draft EIS are considered, agency and tribal consultations are completed, and subsequent discussions are held between DOE and the State of Idaho.

Table 3-5. Summary comparison of the waste processing alternatives.

Alternatives	HLW treatment technology	Mixed transuranic waste/SBW pretreatment	Cease use of Tank Farm ^a	Product HLW	Number of shipments ^b
No Action Alternative	NA	None	Pillar & panel tanks – 2003	NA	NA
Continued Current Operations Alternative	NA	Calcination	Pillar & panel tanks – 2003 Monolithic tanks – 2014	NA	Truck – 140 ^c Rail – 70 ^c
Separations Alternative					
Full Separations Option	Vitrification	None	Pillar & panel tanks – 2003 Monolithic tanks – 2016	780 SRS canisters	Truck – 780 Rail – 160
Planning Basis Option	Vitrification	Calcination	Pillar & panel tanks – 2003 Monolithic tanks – 2014	780 SRS canisters	Truck – 780 Rail – 160 Truck – 140 ^c Rail – 70 ^c
Transuranic Separations	NA	None	Pillar & panel tanks – 2003 Monolithic tanks – 2016	None	Truck – 280 ^c Rail – 140 ^c
Non-Separations Alternative					
Hot Isostatic Pressed Waste Option	Hot isostatic press ^d	Calcination	Pillar & panel tanks – 2003 Monolithic tanks – 2014	5,700 SRS canisters	Truck – 5,700 Rail – 1,100 Truck – 140 ^c Rail – 70 ^c
Direct Cement Waste Option	Hydroceramic cement ^d	Calcination	Pillar & panel tanks – 2003 Monolithic tanks – 2014	18,000 SRS canisters	Truck – 18,000 Rail – 3,600 Truck – 140 ^c Rail – 70 ^c
Early Vitrification Option	Vitrification	None	Pillar & panel tanks – 2003 Monolithic tanks – 2016	11,700 SRS canisters	Truck – 12,000 Rail – 2,400 Truck – 450 ^c Rail – 225 ^c
Minimum INEEL Processing Alternative	Vitrification	None	Pillar & panel tanks – 2003 Monolithic tanks – 2012	625 Hanford canisters	Truck – 630 Rail – 160 Truck – 1,300 ^c Rail – 670 ^c

NA = not applicable, SRS = Savannah River Site

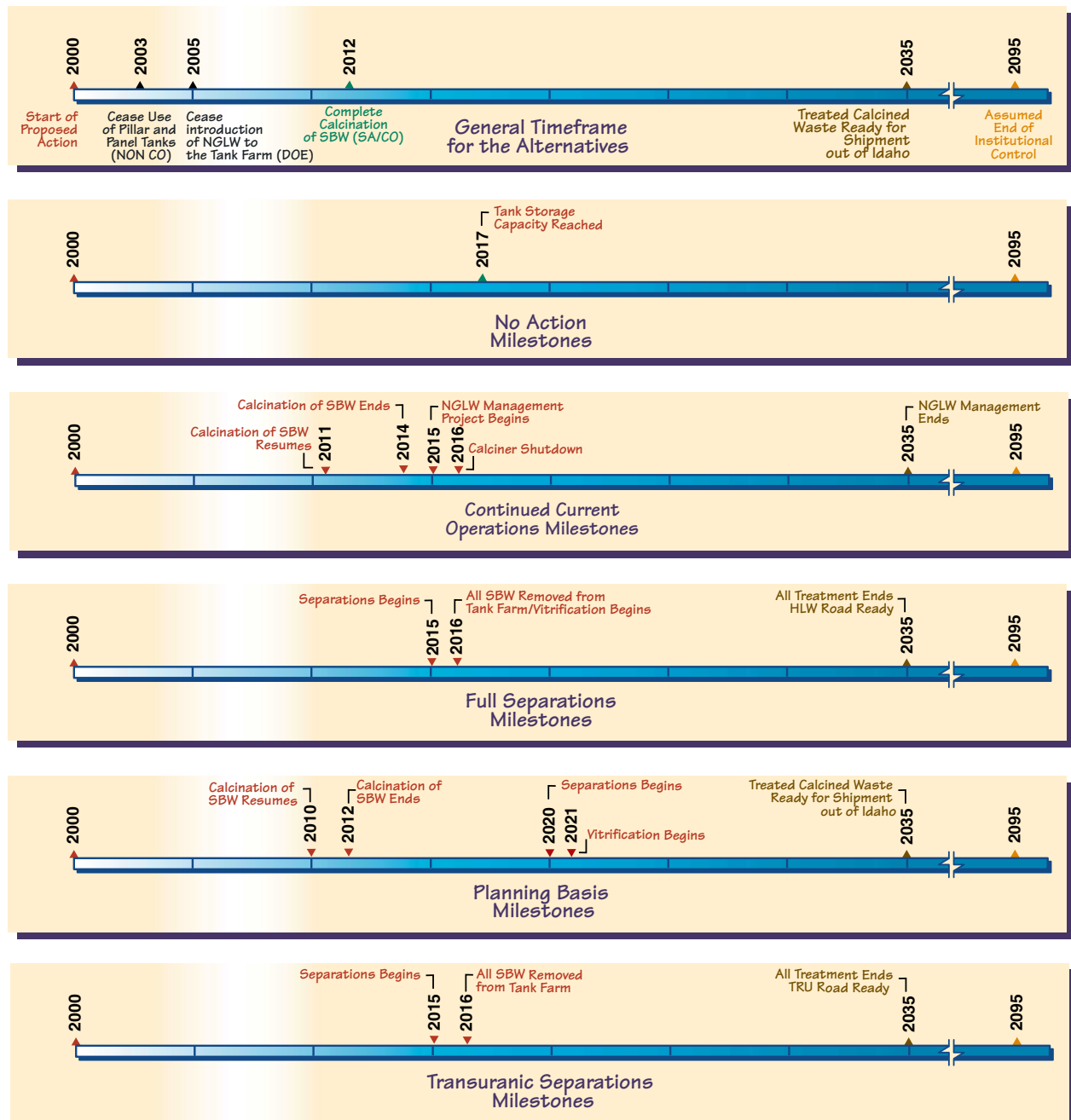
a. Refers to requirement to permanently cease use of the INTEC tanks under the Notice of Noncompliance Consent Order

b. Represents number of truck or rail shipments of HLW canisters between INEEL and a geologic repository, except where otherwise noted.

c. Represents number of transuranic waste shipments to Waste Isolation Pilot Plant.

d. Requires determination of equivalent treatment by EPA and qualification as approved waste form under repository waste acceptance criteria (DOE 1996a; 1999a).

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NOTE: In the event any required NEPA analysis results in the selection after October 16, 1995, of an action which conflicts with any action identified in this Agreement, DOE or the Navy may request a modification of this Agreement to confirm the action in the Agreement to that selected action. Approval of such modification shall not be unreasonable withheld.

LEGEND

SA/CO	Settlement Agreement/ Consent Order	NGLW	Mixed transuranic waste/ newly generated liquid waste
SBW	Mixed transuranic waste/ sodium-bearing waste	NON CO	Notice of Noncompliance Consent Order
TRU	Transuranic waste		

FIGURE 3-16. (1 of 2)
Time Lines



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LEGEND

SA/CO	Settlement Agreement/ Consent Order	NGLW	Mixed transuranic waste/ newly generated liquid waste
SBW	Mixed transuranic waste/ sodium-bearing waste	NON CO	Notice of Noncompliance Consent Order

FIGURE 3-16. (2 of 2)
Time Lines